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Some of the early volumes of the Society's Transactions are out of print. Any single volume of the years 1868-1887, is sold at 10s. to Fellows. The volumes for 1868-1890, in sets of not less than five, as well as the five of the Third Series (1862-1867), can be obtained by Fellows at greatly reduced prices on application to the Secretary. The following is a price list of recently published parts of the TRANSACTIONS—

1928.—Transactions, Vol. LXXVI: Part I, £2 2s. 0d., to Fellows, £1 11s. 6d.; Part II £2 16s. 0d., to Fellows, £2 2s. 0d.

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1931.—Transactions, Vol. LXXIX: Part I, £1 1s. 0d., to Fellows, 15s. 9d.; Part II, £1 10s. 0d., to Fellows, £1 2s. 6d.; Part III, £1 16s. 0d., to Fellows, £1 7s. 0d.

Proceedings, Vol. VI: Part I, 6s. 0d., to Fellows, 4s. 6d.; Part II, 6s. 0d., to Fellows, 4s. 6d.

7th I calculated 15% perfect, 10% females. The females were in some cases rubbed but not so the males, only chipped, and in one or two cases with small holes through one wing, in rarer cases symmetrically through opposite wings. There were many dead *automate* scattered about on the ground, and I personally observed one or two falling. I attribute this to death from exhaustion as the insects were in most cases almost too exhausted to fly. My notes state that on the 8th the proportion of females had risen to 50% and that it was possible to catch any number required of perfect specimens of both sexes. This was no doubt due to the countless millions now passing daily which were far more than the birds could cope with, whereas at the beginning of the flight they had been fewer. On many occasions I found insects with a slightly curved mark on one of the wings, the scales being totally or partially removed, and in some cases the membrane of the wing damaged. (Beak of birds?) The flight was one of 'drift,' the butterflies being observed (with field glasses) to a calculated height of 300 metres, beyond which height more may have passed out of sight. The cause of the migration appears to be search for food, as the insects were not sexually mature until about Dec. 20th, on which date I found traces of embryo eggs for the first time. The first deposited eggs were observed on the same date. The ground population appeared to change daily, insects rising about 7.30-8.30 a.m. and descending about noon. Whilst on the ground they fed greedily. I enclose a few specimens of the damaged insects for your examination. Towards the end of the migration all insects were more or less worn.

"I fed specimens to ducks, who ate them greedily, and to fowls, who at first ate them with suspicion. Later I noted fowls as well as ducks eating them greedily, standing by the side of the lower branches of the flowering *Tamariscus* bushes and picking the *automate* off as fast as they alighted. Small ground lizards ate them dead and sometimes alive, but were handicapped by being unable to catch very many of the latter.

"On several occasions I personally noted unidentified birds (high up) harassing these migrant butterflies."

The eleven males and three females kindly sent by Capt. Hayward were ragged and much worn, but two of them bore the above-described curved mark, probably made by a bird's beak.

Dr. F. A. Dixey has informed me that "*Pieris phileta*, F., often known as *monuste*, L., is the *monuste* of Hübner and others, the Linnean name referring to a Pierine of a different group. *P. phileta* is generally provided with dark markings, especially beneath, but Argentine specimens, *automate* of Burmeister, tend to be pale. The species has a wide distribution extending northwards to Central and the southern part of North America, including also the West Indies."

Attacks of Birds upon Butterflies observed in the Oriental Region by E. C. Stuart Baker.

[Prof. POULTON, in communicating the following notes, said that he was especially pleased to record in the *Proceedings* the opinion of an Ornithologist with the intimate knowledge and long experience of Mr. Stuart Baker.]

As regards birds catching butterflies. This is such a commonplace occurrence in my experience that it is really difficult for me to pick out especial instances, but the following are among those which I definitely remember.

Birds of the genus *Dicrurus* constantly, one might almost say habitually, feed to some extent on butterflies, and I remember on one occasion watching a pair of King Crows (*D. macrocerus*) feeding on a swarm of small white butterflies much like specimens of our British "Small Garden White." Whilst I was watching, these birds certainly caught a dozen butterflies and possibly a great many more. The point that impressed me so much was the neatness with which they jerked the head of the butterfly into their mouths and then with one clip of the bill, cut off all four wings and swallowed the remainder.

The Paradise Drongo (*Dissumurus paradiseus*) constantly eats butterflies, and a tame bird in my possession which was allowed perfect freedom often used to catch butterflies in my presence. I remember once a branch of a tree with hundreds of pupae of a butterfly which we used to call the "Painted Lady," *Pyrameis* (*Vanessa*) *cardui*, L., was brought to me by a Naga. I hung this up in my verandah and the butterflies began to emerge the same day. The next morning I discovered my pet busily engaged in catching these butterflies as they fluttered off the branch.

The Little Fly-catcher (*Siphia parva*) constantly catches small butterflies, and one which had an observation post on my garden railing often caught one whilst I was looking on, and I remember distinctly its catching one of the little brown Skippers, a feat of no little difficulty. I have seen several other species of Fly-catcher (*Tchitrea*, *Alseonax*, *Cyornis*, etc.) catching butterflies. Birds of the genus *Batrachostomus* habitually catch moths, and I once watched a pair of these birds for some time, in a glade in a forest in moonlight, catching them. The moths were of considerable size, bigger than the English SPHINGIDAE, but it was difficult in the moonlight to determine their colour, though they appeared white or nearly so.—E.C.S.B.

Nesting associations between Birds and Wasps, Ants, or Termites, in the Oriental Region, by E. C. Stuart Baker, O.B.E., M.B.O.U., etc.

[Prof. POULTON communicated the following paper and pointed out its special interest in relation to recent descriptions of these associations in other parts of the world (1929, *Proc. Ent. Soc. Lond.*, 4: 80-90; 1930, 5: 44, 111-114).—He was most grateful to his friend for kindly consenting to add these Oriental records which were so necessary to complete the survey of a fascinating and important subject.]

My first experience of these associations was in 1882, when I found the nest of one of our Little Indian Sunbirds, *Leptocomia asiatica*, built in a low bush on the edge of a Kydstreet tank in Calcutta. In the same bush was a small hanging nest of a large hornet only a few inches away from the bird's nest. On inspecting the nest I disturbed the hornets and got very severely stung. On two other occasions, both in Calcutta, I found the same combination of nests built in small bushes round tanks. On one occasion I watched both birds and hornets going in and out of the bush for some time, but they seemed to pay little or no attention to one another. Obviously the birds obtained considerable protection from the

vicinity of the hornets' nest, though whether the protection was sought or merely accidental is another question. There were equally suitable bushes all round about the tank in which the birds could have nested had they so desired.

Once when after a Gaūr, in the North Kachar Hills at an elevation of some 4,000 feet, my notice was attracted by a Sunbird flying out of some bracken, and on examination I found a nest of the bird, *Aethopyga seheriae*, a little pendant purse-like affair, hanging from the stem of one of the bracken fronds. On reaching out my hand to take the nest I disturbed half a dozen large hornets and got a glimpse of their nest, apparently very similar to that of the species consorting with the Purple Sunbird (*L. asiatica*). I do not know the name of the hornet, but the nest it makes is a small, black, papier-mâché ball about the size of an orange with an entrance at the bottom. Inside this ball there is a little umbrella in which the cells for the larvae are formed. Such a nest may have a colony of anything from four to eight or ten hornets. I am myself almost immune from the stings of any of the wasp tribe, but a man who was with me and was stung by one only of these insects, had a very bad arm for some time afterwards.

The Little Flower-pecker, *Dicaeum olivaceum*, which makes a tiny oval nest of the finest cotton down, often placed very high up in bunches of parasitic plants on big trees, is said by the natives to select those which form a home for wild bees, and a tree from which one of these nests had been taken and which I afterwards examined certainly had a swarm of bees in a large main branch some twenty or thirty feet below where the little bird's nest had been built.

Many Woodpeckers habitually make their nesting burrows actually in ants' nests. The Woodpeckers are generally those of the genus *Micropternus* and so far as my experience goes certainly four out of five of their nests are made in those of the ants. Again I am afraid I cannot tell you the name of the ant, but there are two kinds. One is a very virulent, red ant, with a darker thorax; the body rather long and attenuated and the legs also rather long for an ant. The other is smaller but equally vicious, pale red and almost transparent. Both ants build nests of the same description. The material is like that of the hornets, very stiff, brittle papier-mâché. The shape is that of a football and may be anything from one to two and a half feet in diameter, the whole of the interior being one mass of cells. It is placed generally high up in a tree, most often about forty or fifty feet, often very much higher, but seldom much lower, though I have seen one within a few feet of the ground. The Woodpecker bores its nesting tunnel into the heart of one of these nests and then excavates a hole sufficiently big to hold the eggs and the young birds when hatched. It seems to be a matter of indifference whether the ants' nest is occupied or not, but undoubtedly in the majority of cases the birds select an occupied nest, and I have taken or seen recently hatched young ones with the original owners of the nest running all over them. I am afraid that in most cases the Woodpeckers return the hospitality of the ants by eating them, but in some instances they apparently leave their hosts alone, although their regular diet consists mainly of ants with their larvae and pupae. The bite of these ants is most unpleasant and one would have imagined that a single ant could soon dispose of a nestling Woodpecker unless these are immune from the effects of bites. It is a curious fact that the eggs of this particular genus of Woodpecker

are in texture utterly unlike those of any other bird of the same family. Normally, as one knows, eggs of the PICIDAE are remarkable for being exceptionally hard, glossy and opaque, whilst those of this genus of Woodpecker are very soft, fragile and transparent. Whether this is due to the action of formic acid or not I do not know, but undoubtedly when individuals of *Micropternus* follow the example of other Woodpeckers and make their nest-holes in trees and not in ants' nests, their eggs are far more like those characteristic of PICIDAE.

Many of the Kingfishers also make their nests in the nests of ants and termites. The Black-headed Kingfisher, *Halcyon pileata*, often selects the termites' mound in mid-forest as a site for its burrow, though it also sometimes makes this in banks of streams like other Kingfishers.

Sauropatus chloris also generally makes its nest either in a termites' nest or in that of ants, and its breeding habits are described * by Mr. E. G. Herbert as follows :—

“*Sauropatus chloris chloris*.

The White-Collared Kingfisher.

Vernacular ‘Nok poh piu.’

“The Bangkok district seems to be a popular nesting place for this Kingfisher, as it is present in greater numbers at that season than at any other time of the year. It may be seen during the latter part of December, increasing slowly in numbers up to the commencement of the rains, and it appears to leave towards the latter part of the rains. It is a very noisy bird and the harsh screeching call of ‘kerk kerk kerk kerk’ is well known anywhere near its haunts. When it is excited the call is punctuated in twos, but otherwise it is uttered as above in a continuous four.

“The nest is nearly always made in a black ants' nest, which is situated in a hollow tree at a height of about twenty feet from the ground. The ants will often block a big hole of a foot or more in diameter in a growing tree, though at times the hole will not measure more than a few inches. The birds bore a neat circular hole in the ‘live’ ants' nest, and excavate a cavity just inside for the egg chamber. Occasionally the nest may be found in a dead stump of a tree, where the wood is comparatively soft and can be easily worked. I have seen two instances of this, one at a height of twelve feet, and the other within a foot of the ground. Another situation was in a white-ants' hill, which was about three feet high, and it may be of interest to give an account of this.

“The white-ants' hill was close to a native house in a fruit garden near Paklat, and the first time I visited the place was on 16/5/13. On this occasion the young had left the nest and were sitting on a tree close by. The owner of the house offered to show me the nest, and chipped a line around the side of the ant hill at the level of the entrance hole, so that the top could be lifted off complete. This he did, exposing to view the nest and entrance tunnel. He said that he had taken the top off in this way on several occasions and that the birds had not deserted. He also stated that the birds nested there every year at about the same time. The following year I again visited the spot, and the man opened the nest in the same way, showing me on this occasion three half-fledged birds. The parents were

* 1924 *J. Nat. Hist. Soc. Siam*, 6 : 310.

exceedingly noisy and kept very close whilst this was going on, but shortly after we had finished one of them entered the nest, so there was no fear of them deserting. The ants' nest was 'alive,' and the ants set to work at once to join up the top with the main block. The base of this ant hill, below the entrance to the nest, was littered with pieces of the shells and claws of the small land-crabs, showing that this is the principal food of these birds. It is from the eating of these crabs that this Kingfisher derives its local name. The fruit-gardens appear to be the favourite nesting place for this bird, although nests may also be found in other places. May is the best month for eggs, as that is the time when most of the nests are made, but I have found eggs as early as the 10th March, and young birds in the nest as late as 22nd August."

Other races of this Kingfisher, e.g. *S. c. davisoni* and *S. c. vidali*, have similar habits, though the last mentioned seems to keep almost entirely to termites' nests, but it selects those which are formed either in or around hollow trees.

Reverting to wasps and hornets I should have told you that the very common Golden Weaver-bird (*Ploceëla chrysaea*) nearly always selects a site in a bush or reed-bed close to where there is a hornets' nest. The birds breed in colonies, and the hornets also often build several of their small papier-mâché nests within a few yards of one another. This mixed breeding-ground for hornets and finches is so commonly the case in Southern Burma that it certainly looks as if deliberate choice was made by the birds of bushes either containing a hornets' nest or close to one. The advanced stage of the pupae show that the hornets are first on the spot and are followed by the birds. I have not seen this practice followed by any of our Weaver-birds which build on palms and other trees, but twice I have been stung by a large wasp when examining nests of *Ploceus manyar*, the Black-breasted Weaver-bird, and on each of these occasions found a wasps' nest close by—only a yard or two away. I also once found the nest of the little Munia, *Amadava amadava*, in a Pomegranate tree within a few inches of a small wasps' nest. This was in 1896 at Lakhapon in Annam.—E.C.S.B., 4 Mar. 1931.

Lantern illustrations of associations between Australian birds and wasps or Termites.

Prof. POULTON exhibited on the screen the following slides illustrating Mr. W. B. Alexander's paper (1930, *Proc. Ent. Soc. Lond.*, 5 : 111–114). The slides had been prepared by Mr. Alfred Robinson from plates of the *Emu*, kindly lent to him by Mr. Alexander.

1. A nest of the Yellow Fly-eater (*Gerygone flavida*) and adjacent wasps' nest (1917, *Emu*, 17 : 21, pl. iii), described by Mr. Alexander on p. 112.
2. Eggs of the Beautiful Parrot (*Psephotus pulcherrimus*) in its nest excavated in a Termites' mound (1922, *Emu*, 22 : 4–17, pl. viii), described on p. 113.
3. Nest of the same species with male at the entrance and female above on the top of the mound (*Ibid.*, pl. v), described *loc. cit.*
4. Entrance to nest of Golden-shouldered Parrot (*Psephotus chrysopterygius*) in a spire-shaped Termitarium (*Ibid.*, p. 98, pl. xxx), referred to *loc. cit.*

A gynandromorph of *Saturnia pavonia*, L. (*carpini*, Schiff.).

Prof. POULTON exhibited on the screen a beautiful coloured slide of *S. pavonia*, kindly lent to him by Mr. Harry Britten, F.E.S. The specimen, bred April 1927, from a larva found near Buxton in the previous year, was stated to be a female. In the size, shape, pattern and colours of the wings it appeared to be typically female on the left side and typically male on the right.

Stereoscopic photomicrographs of Oligocene fossil insects from the Isle of Wight.

Mr. J. F. MARSHALL and Mr. J. STALEY exhibited stereographs of Oligocene fossil insects prepared in accordance with a suggestion made by Prof. E. B. Poulton, F.R.S., that the photomicrographic methods employed by the British Mosquito Control Institute, Hayling Island, might be of value for the purpose of producing illustrations of fossil insect specimens. A number of fossil insects submitted by Prof. Poulton, Mr. J. E. Collin and the Zoology Department of the British Museum (Natural History) were photographed in this way.

Since, in the majority of cases, the fossil insect is made up of cavities and depressions, the experiment was tried of mounting the stereographs with the two views transposed, so as to present the "left-eye" view to the right eye of the observer, and vice versa. Since this transposition causes a reversal of perspective, the various parts of the insect appear, not as hollows, but in bold relief; a "cast" of the insect being thus, as it were, optically created.

It is suggested that this method (which appears to be a new application of stereoscopic photography) not only greatly facilitates the examination of fossil insect specimens, but may also be used to advantage in other branches of scientific work.

Some of the stereographs exhibited were mounted in sets of three—a "right-eye" view being interposed between two "left-eye" views. The object then appears in normal or reversed perspective according as the left- or right-hand pair of views is looked at through the stereoscope.

Dr. F. W. Edwards commented as follows on two of the photographs shown by Messrs. Marshall and Staley :—

Gymnastes fasciatipennis, Ckll. (1921, *Ann. Mag. Nat. Hist.* (9) 7: 456). The specimen of this small Tipulid is in beautiful preservation, and the characteristic wing-markings of the genus *Gymnastes* are well preserved in the fossil and admirably portrayed in the photograph. This fossil species is very similar to several still existing in the Oriental region, and is perhaps closest to *G. flavitibia*, Alex., of southern Japan, which has almost identical wing-markings but differs slightly in venation, a cross-vein connecting the short vein R_2 with R_1 being present in the recent species but apparently absent in the fossil. According to Cockerell's original description and figure, *G. fasciatipennis* is characterised by having an open discal cell and *m-cu* before base of cell, but comparison of the type with the present more perfect specimen showed that both of these statements were incorrect.

The photograph of a mosquito wing was of interest as showing the preservation in the fossil of the scales on the veins and margin of the wing. As in the case of the TIPULIDAE there were no striking differences between the Oligocene mosquitoes of the Isle of Wight and those living at the present day, but the remains indicated

that the British fauna of that period was similar to the present fauna of south-eastern Asia. A similar conclusion had been reached by botanists in regard to the flora.

Mr. J. E. COLLIN commented as follows:—The fossil Stratiomyid was described by Cockerell as *Stratiomys brodiei* in 1915 (*Proc. U.S. Nat. Mus.*, 49: 494, pl. 63, f. 8) from specimens in the Brodie Collection of the British Museum (Natural History). These specimens were obtained by Brodie from the same Oligocene beds of the Isle of Wight as the fossils now exhibited, and there are a large number of examples in the Brodie and E. J. A'Court Smith Collections at the British Museum. There is such considerable difference in size among these specimens that more than one species are almost certainly represented, but as the specific differences in STRATIOMYIDAE are not such as can be recognised with any certainty in fossil specimens, these species cannot be satisfactorily separated.

An examination of the fossils makes it quite clear that Cockerell was incorrect in referring the species to the genus *Stratiomys*. In *Stratiomys* the basal antennal segment is elongate, while in all the fossils in which the antennae are visible this segment is short (fig. 1). A Stratiomyid with such antennae and with a general

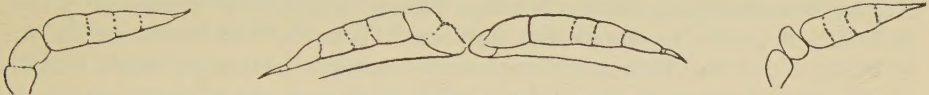


FIG. 1.—Antennae of fossil *Odontomyia* sp.

outline and wing-venation of the fossil specimens must be referred to the genus *Odontomyia*. A comparison with typical *Odontomyia* reveals two conspicuous differences. In typical *Odontomyia* the scutellum has a pair of projecting teeth or tubercles on the hind margin while the metanotum or post-scutellum is overshadowed by the scutellum and less projecting. In the "caste" of these parts in the fossils there are no indications of scutellar teeth while the postscutellum is larger and more projecting than scutellum. This projection of the postscutellum (it sometimes projects above the level of scutellum) may, however, quite possibly be due to distortion from pressure.

Species of *Odontomyia* without scutellar teeth have been described from the Oriental Region (*O. mutica*, Wulp), from North America (*O. nigriventris*, Lw., and *O. fallax*, Johns.), and from Central America (*O. inermis*, Wied.), while Bigot based a genus (*Inermyia*) upon this character. In regard to Bigot's genus it may be noted that while he gave *edentula*, Wied., as the type of his genus, the species in his collection under *Inermyia* is an apparently undescribed *Odontomyia* from Mexico. In this species of Bigot's the postscutellum is not more developed than in typical *Odontomyia* and certainly not so prominent as in the fossils.

In wing-venation the fossils appear to differ but little from the highly specialised type of venation of present-day species. There is some question whether the two short upper branches from cubital vein to costa of typical *Odontomyia* are always present; they are certainly present in some specimens, but being naturally somewhat feeble veins they may not always have left a visible impression on the matrix in which the fossil flies are embedded. These short veins are absent in the existing subgenus *Hoplodonta* of *Odontomyia*, but in the size and shape of discal cell the fossil wing is quite unlike that of *Hoplodonta*.

One can only conclude that these fossil Stratiomyids represent the Oligocene ancestor of the modern genus *Odontomyia*.

Prof. Poulton said that the beautiful fossils described by Dr. Edwards and Mr. Collin had been collected by his friend Mr. G. W. Colenutt, F.G.S., in the locality from which the A'Court Smith collection, now in the Natural History Museum, had been obtained. It was wonderful that the pigmented pattern on the wing of the Tipulid *Gymnastes* should have been preserved unchanged through the vast interval of time which separated us from the Oligocene. Mr. Colenutt had kindly presented the exhibited specimens to the Hope Department of the Oxford University Museum, where they could be studied and compared with existing species.

Wednesday, April 1st, 1931.

Mr. H. WILLOUGHBY ELLIS, Vice-President, in the Chair.

Election of Fellows.

The following were elected Honorary Fellows of the Society :—Professor H. REBEL, of the Naturhistorischen Museum, Vienna; Professor F. SILVESTRI, of the R. Istituto Superiore Agrario, Portici, Italy; and Professor W. M. WHEELER, Ph.D., Sc.D., LL.D., of the Museum of Comparative Zoology, Cambridge, Mass., U.S.A.

The following was elected a Special Life Fellow of the Society :—HAROLD POWELL, Pharmacie du Croissant, Meknès-Medina, Morocco.

The following were elected Ordinary Fellows of the Society :—Mrs. KATHERINE J. GRANT, Brook Cottage, Whitmore Vale, Churt, Surrey; and W. NEWBOLD, O.B.E., M.A., Imberley Lodge, East Grinstead, Sussex.

Exhibits.

Gynandromorphs and Mermithogynes in Nematocerosus Diptera.

Dr. F. W. EDWARDS exhibited male, female and gynandromorph specimens of two species of CHIRONOMIDAE (*Cricotopus biformis*, Edw., from Hertfordshire, and *Chironomus cingulatus*, Meig., from Shrewsbury) and one Simuliid (a new species of *Simulium* from Patagonia). The cause of the gynandromorphism was not known, but it was suggested that it might be due to parasitic castration by the worm *Mermis*, which is known to be a common parasite of *Simulium*; support for this assumption had been obtained by the discovery of two adult *Chironomus* at Windermere in 1929 containing *Mermis*, both these specimens (one *C. anthracinus*, Zett., and one *C. paganus*, Mg.) being gynandromorphic. In the case of the CHIRONOMIDAE exhibited, as well as those noted as taken at Windermere, the gynandromorphs all had short, non-plumose antennae like those of the female, but the external genitalia of a normal male. In the Patagonian *Simulium* the normal male has the usual enlarged eyes and swollen hind tarsi of this sex, its thorax being all black and legs dark; the normal female has smaller, simple eyes and slender hind tarsi, its thorax being entirely reddish and legs pale. Specimens believed to be gynandromorphs of this species were found, two types occurring; all had female external genitalia, and the thorax mainly blackish but with reddish shoulders; in one type the eyes, though simple, were somewhat larger than in normal females, and the legs were practically those of a normal male; in the other type both eyes and legs were of female character. In the case of *Cricotopus biformis* and also in the *Simulium*

gynandromorphs were found in large numbers, and if they are caused by parasitism, the incidence of parasitic infection must be very heavy.

Dr. H. SCOTT mentioned the special *Mermis*-infested forms (mermithergates) of certain species of ants and remarked that cases of parasitism by *Mermis* are also known in termites, though apparently rare. A worker of *Cornitermes orthocephalus*, Silvestri, from Brazil, containing a larval *Mermis* (sp. indet.) in its abdomen was described and figured by Mr. W. Ruttledge (*Parasitology*, 17 : 187, 188) in 1925. At that time only one other record could be traced, namely, a soldier of *Thoracotermes brevinotus*, Silvestri, from West Africa, having a *Mermis* (unidentified) inside its abdomen. In neither case were the external characters of the termite rendered abnormal by the presence of the parasite. Dr. Scott further recalled his own discovery (see *Parasitology*, 17 : 176-186, 1925) of a great modification of the genital armature in a few specimens of certain species of *Nesotheca*, an endemic genus of Anobiid beetles from the Seychelles. In two cases the aedeagus was much reduced and altered, and the abdomen of one of these specimens contained a few larval Nematodes, though it could not be determined whether these belonged to the MERMITHIDAE or some other family. If the partial atrophy of the aedeagus was due to the presence of the parasites, it should be referred to the category of "parasitic castration." It would then be paralleled by the effects of stylopisation of bees in some cases, and of the presence of Hymenopterous or Dipterous parasites in the bodies of certain leaf-hoppers (*Typhlocyba*). Illustrations from the works cited were shown on the screen.

An unusual type of compound eye in a Cecidomyid.

Dr. A. D. IMMS exhibited micro-slides and a drawing of the head of a peculiar new genus of CECIDOMYIDAE. The insects themselves were sent to the Imperial Institute of Entomology by Mr. E. Hargreaves from Sierra Leone, who discovered the larvae feeding upon a mealybug. Dr. H. F. Barnes of the Rothamsted Experimental Station has investigated the structure of this peculiar midge and is about to publish a description of it. The usual disposition of compound eyes in the CECIDOMYIDAE is the one in which the two eyes are contiguous, or nearly so, in the mid-dorsal line and extend downwards on either side. In the species exhibited there are three compound eyes, two of them being lateral and the third dorsal in position. It appears that this condition has arisen owing to each compound eye becoming separated into a dorsal and a ventral portion. The two dorsal portions, situated on the top of the head, have apparently become fused in the median line to form an unpaired eye. This phenomenon is only known to occur in the species of the new genus exhibited and in the genus *Trisopsis*, Kieffer, which includes four species. Both genera, it may be added, are members of the subfamily CECIDOMYINAE.

The larva of *Hippotion exclamationis austrinum*.

Dr. K. JORDAN exhibited the hawkmoth, *Hippotion exclamationis austrinum*, Jordan (1930) and photographs of larvae sent to him by Mr. E. E. Platt, F.E.S., who obtained them at Eshowe, Zululand, and successfully bred a number of specimens of the moth. Dr. Jordan drew attention to the close adaptation of the larvae to the surface-structure of the food-plant and remarked in particular that the conspicuous white side-line of the larva represented the line of light in drawings and photographs of cylindrical bodies and ridges.

Notes on the date of issue of the parts of Volume I of W. H. Edwards' *Butterflies of North America* and on the plates by Wiest in that work subsequently rejected by the author.

Captain A. F. HEMMING exhibited the copy of Part 1 as issued of W. H. Edwards' *Butterflies of North America* belonging to the Society's Library, and compared the plates contained in it with the corresponding plates in the copy of the completed work presented to the Society by the author. On this point and on the dates of issue of the various parts of this volume, he communicated the following notes:—

I recently acquired some odd parts of Volume I of W. H. Edwards' *Butterflies of North America* in their original paper wrappers exactly as issued. Among these was Part 3, which is dated on the cover "December 1868." In the Part in my possession there is, however, a single sheet headed Prospectus which reads as follows:

PROSPECTUS. / The subscriber proposes to issue in numbers at intervals of three months, / "THE BUTTERFLIES OF NORTH AMERICA." / Each number will contain five plates drawn on stone, life size, and carefully / colored from nature. Twelve numbers will make a volume, and each volume will / be complete in itself.

The species given will be mostly new, or if old, those that have heretofore / been incorrectly described or figured. The descriptions will be printed in large / type on fine paper; size quarto.

Parts 1, 2 and 3 are ready for delivery. Part 1 contains *Argynnis Diana*, / *A. Cybele*, *A. Aphrodite*, *A. Nokomis*, and *A. Atlantis*. Part 2 contains *Argynnis Callippe*, *A. Hesperis*, *Colias Alexandra*, *C. Helena*, *C. Christina*, *C. Behrii*, / and *Apatura Alicia*. Part 3 contains *Argynnis Monticola*, *A. Halcyone*, *Limenitis Proserpina*, *Lycaena violacea*, *L. Lygdamus*, *Thecla laeta*, and *T. acadica*.

Part 4 will contain *Argynnis Leto*, *Limenitis Weidemeyerii*, *Colias Eurytheme*, *C. Keewaydin*, *Thecla Strigosa*, and *T. Ontario*.

Part 5 will contain *Argynnis Edwardsii*, *Colias Eurydice*, *Lycaena pseudargiolus*, *L. neglecta*, *Grapta interrogationis*, and *G. Satyrus (C-aureum)*.

With Part 3 is commenced a Synopsis of North American species, to be / completed within the volume.

PRICE PER PART \$2.50, PAYABLE ON DELIVERY.

Persons wishing to subscribe will address E. T. Cresson, American Entomological Society, 518 So. 13th Street, Philadelphia, Pa.

W. H. EDWARDS.

Philadelphia, April, 1869.

Note.—Owing to the increased expense of the drawings on stone, as well as of coloring the / plates since the issue of Part 1, it is found necessary to increase the price of each Part to \$2.50 to all / new subscribers subsequent to the issue of Part 3, and to all persons who have not received the work / direct from the pub-

lishers. The "Synopsis of North American Butterflies" will be furnished separately as the sheets appear, at \$1.00. A title page and cover will accompany the last number. [OVER.

The importance of this prospectus is that it is dated "April 1869." There is therefore here a strong *prima facie* case for thinking that at any rate this part was issued at a date materially later than that stated on the wrapper.

Another line of approach was suggested by the fact that this work was published by the American Entomological Society, and that on three occasions references are made in their Transactions to the receipt in their Library of Parts as issued. As it was their own publication, it is reasonable to assume that these dates approximate very closely to, if (as is more probable) they are not identical with, the actual date of publication.

The instances referred to above are as follows :—

Number of Part.	Date on Wrapper.	Date of receipt in Library of American Entomological Society.
1.	April 1868.	1868 before June 8th.
2.	August 1868.	1868 after October 12th and before November 9th.
4.	April 1869.	1869 before September 15th.

The dates on which these parts were received in the Library of the Society by which the work was published support the view that the dates on the wrappers are earlier than the actual date of publication. The evidence on this point is particularly suggestive in regard to Part 2, which though dated August 1868 was not received before October 12th at the earliest.

The most important evidence on this question is, however, afforded by the copy of this work contained in the Library of the Entomological Society of London. This copy bears the following inscription by Edwards on the title-page :—

" Presented to the Entomological Society
by W. H. Edwards
1 Apl. 1879. Coalburgh W. Va."

This copy appears to have been very carefully looked over by Edwards before he presented it to the Society. All the pages are numbered in pencil in accordance with the arrangement suggested in the table at the end of the volume, and the page numbers themselves given in that table are amended where necessary. Finally, and much the most important, the dates of publication of the various parts given on the immediately following page (the last in the volume) are also corrected in pencil. An additional note is given in pencil regarding the date of issue of the supplementary part, which is not referred to in the table as published. The dates of issue of the several parts as stated at the end of Volume I and as amended in the author's presentation copy to the Society are as follows :—

Number of Part.	* Date printed in list at end of Volume I.	Date as corrected in copy presented by W. H. Edwards to the Entomological Society of London.
1.	April 1868.	June 1868.
2.	August 1868.	October 1868.
3.	December 1868.	May 1869.
4.	April 1869.	September 1869.
5.	December 1869.	April 1870.
6.	June 1870.	August 1870.
7.	January 1871.	March 1871.
8.	August 1871.	September 1871.
9.	December 1871.	January 1872.
10.	July 1872.	September 1872.
Supplement.	(Not referred to.)	January 1873.

* These dates correspond with the dates given on the wrappers, in all cases where the latter are available.

These ms. emendations corroborate and explain the doubts in regard to the dates of Part 3 suggested by Edwards' prospectus, and in regard to the dates of Parts 1, 2 and 4 suggested by the date of their receipt in the Library of the American Entomological Society. Until therefore strong countervailing evidence is forthcoming, the amended dates given in the above table should be accepted as the dates of issue of the eleven parts that make up this volume.

Dr. W. J. Holland (1928) has recently drawn attention to the fact that two plates (Plate I *Argynnis* and Plate IV *Argynnis*) as originally issued in 1868 in Part 1 of this volume were executed by D. Wiest, and that in the Supplementary Part (issued in 1873) revised plates drawn by Mary Peart were issued as substitutes together with a revised substitute text for Plate IV. It appears from Dr. Holland's paper that the Wiest versions of these two plates are now extremely rare in the United States. So much so indeed that Dr. Skinner (1918) actually stated that they were never issued. It is therefore perhaps of interest to place on record that at least two copies exist in this country. One is in the Library of the Entomological Society of London (presented, separately, to the Society by W. H. Edwards) and the other in my own library.

Plate *Argynnis* i illustrates *A. diana* Cram. (1777) and raises no difficulty, as clearly Wiest's and Mary Peart's plates represent the same species in regard to the identity of which there is no doubt.

Plate *Argynnis* iv is, however, of great importance from the point of view of the identification of the species figured. Wiest's plate consists of figures of the upperside and underside of what was then the only known specimen of *Argynnis nokomis*, Edwards (1862), i.e. the type specimen (a male) which is stated to have been "taken among the Bitter Root Mountains, Montana." Miss Peart's version of this plate, published five years later, consists of four figures (1, 2, ♂ 3, 4, ♀) drawn from specimens taken in 1871 by Lt. Wheeler in Arizona. It was these figures that Skinner subsequently (1918) designated as the types of *Argynnis apacheana*, Skinner, on the ground that they did not correspond with the original description of *A. nokomis*, Edwards. (i.e. with the description of the unique specimen figured on Wiest's plate), which he claimed was identical with the species subsequently described by Edwards (1874) as *Argynnis nitocris*. Dr. Holland (1928) has given good reasons for rejecting this contention. *A. nitocris*, Edw., should therefore be restored to the list of North American Argynnids, and *A. apacheana*, Skin., should be sunk as a synonym of *A. nokomis*, Edw.

(1918) SKINNER, H. Ent. News, Philad., 29 : 67.

(1928) HOLLAND, W. J. Ann. Carnegie Mus., 19 : 17, 26.

A Case of "Assembling" in the PHASMIDAE.

Mr. Hy. J. TURNER read the following note from Mr. J. Sneyd Taylor, M.A., State Entomologist in the Transvaal, S. Africa.

"Barberton, 10.iii.1931.

"I wonder if you have ever heard of the phenomenon known as 'assembling' among the PHASMIDAE? Some time ago a friend brought me a particularly large 'stick insect' with vestigial wings. It was placed in a cage on the verandah, and I fed it from time to time. We thought no more about it for some time, when one day my wife remarked on the unusually large number of 'stick insects' which come flying about the house at night. Generally we only see a few during the season. One of these winged specimens, males apparently and very much smaller than the female in the cage, was placed with it, and the next day they were found in copulation and remained so for over 24 hours. I am now waiting for eggs.

"It looks to me very much like a case of 'assembling,' for as I mentioned before we rarely see these winged males, while my next-door neighbour, also an entomologist, tells me that he has not noticed any this season. It may, of course, be nothing new, or it may be only a coincidence."—J.S.T.

Dr. H. SCOTT said he had met with a case of the assembling of a number of males, attracted by a single female, in the Seychelles. The Phasmid concerned was *Carausius alluaudi* (Bolívar), a form in which both sexes are quite wingless. He found six males clasping (with the lobes of the anal segment) a single female at various points on the underside of the abdomen, while a seventh male stood close by. This occurred in the high forest above Cascade, Mahé, 23.i.1909, and was recorded by Bolívar and Ferrière in the Report on the PHASMIDAE collected by the Percy Sladen Trust Expedition (1912, *Trans. Linn. Soc., Zool.*, (2) 15 : 295). Despite the wingless condition, the sexes of this species look very different, the males being smaller, more slender and conspicuously reddish during life, while the females are larger and greyish-brown.

Wednesday, May 6th, 1931.

Dr. H. ELTRINGHAM, F.R.S., President, in the Chair.

Election of Fellow.

The following was elected a Fellow of the Society :—JOHN COWLEY, B.A., Sidney Sussex College, Cambridge.

Obituary.

The deaths of Professor J. H. COMSTOCK (an Honorary Fellow of the Society), and of Mr. H. E. NORRIS, were announced.

Exhibits.

A Remarkable Aphid from Windsor Forest.

Mr. H. St. J. K. DONISTHORPE said that when evening sweeping in a plantation in Windsor Forest on 23rd June, 1930, he had taken a remarkable Aphid, the

eyes of which were attached to short stalks, a striking drawing of which by Miss Kirk was exhibited. Professor Silvestri, Mr. Laing, Dr. Scott, and others, who had seen the insect, had all failed to identify it. He said that the plantation in question was situated on high sandy ground, and had been planted about 1860. It consists of birch, oak, and Scots pine, and fairly long grass and herbage.

A Captive Colony of *Myrmecina graminicola*, Latr.

Mr. DONISTHORPE also exhibited a colony of this ant, which he had now kept in captivity for twenty-one years, and said :

"On May 1st, 1910, when at Boxhill, I discovered an incipient colony of *Myrmecina graminicola*, Latr., situated in a hollow flint. It consisted of a dealated female, a very few workers, eggs and larvae. This tiny colony was taken home and fixed up in a plaster nest, and I have had it under observation ever since. So far as I am aware, this is by far the longest period that any single colony of ants has been kept in captivity. To give the whole history of these ants during the past twenty-one years would take too long; I will therefore concentrate on the most important fact—the production of females in captivity. It was formerly supposed that queen ants were not reared in captivity, the only exception being recorded by the late Lord Avebury, in a case in which the nest had been richly supplied with animal food. On July 1st, 1915, winged females were first produced in the colony now exhibited, and with the exception of three years to be discussed presently, they have been regularly reared ever since. I have expressed the view which I still hold that ants do not rear the winged forms until the colony has reached a certain strength, and sufficient workers have been produced; then given abundant and suitable food they will produce the sexes. Having reached this stage, the ants are able to rear the sexes (males may also be produced under certain circumstances from parthenogenetic eggs), and judging from my experiments, I do not believe that the queen lays eggs which must become female, but that the workers bring this about by extra feeding of their larvae. Emery expressed the view that females are only produced from larvae which have been fed with liquid food disgorged into their mouths by the ants, and not by bits of insects and other animal food given to them. Also the most important reason why they are produced is when there is no queen in a nest. In 1922, many more winged females, and far fewer males, were reared than in any single year previously, the colony having been given less food in the previous winter than usual, but an abundance of animal food (raw beef, etc.) was fed to the larvae in the spring. Also there can never have been the impulse to bring up females, through their absence, as the original queen, the queen-mother of the colony, was present in 1915 when winged females were first produced, and ever since, the colony has consisted of as many females as workers.

"To return to the three occasions on which females were not reared—in August 1919 very serious fighting occurred indiscriminately between workers and dealated females. This lasted for nearly two months, and I was much afraid I should lose the whole colony, as some one hundred ants were killed off in this way. It is very difficult to explain this, for the colony had plenty of food and a large brood to attend to. It was put a stop to in the end by punishing any ant, or ants, who

were fighting. They were knocked off their legs with a paint-brush, pushed about, rolled over, and shaken about until they appeared to be thoroughly cowed. In 1920 the colony had recovered and was in a flourishing condition; but no winged females were reared for the first time for four years. I believe that the fighting which occurred in 1919 was the cause of this.

"In October 1924 the nest was placed in a cold room and the ants were not fed again, the nest only being watered occasionally, until May 1925. A number of males, but no winged females, were reared in 1925. Having visited Sicily during the winter of 1925-26, the nest was again kept in a cold room and without food during my absence. Males, but no winged females, were produced in 1926.

"I consider the two last experiments prove that it is the food given to the larvae, which causes the production of females; and that the sex of an ant is not already determined in the egg."

Butterflies from Sierra Leone.

Mr. I. R. P. HESLOP exhibited and made remarks upon some butterflies from Sierra Leone.

A supposed Larva of *Hydrilla palustris*.

Dr. E. A. COCKAYNE exhibited and made remarks upon a larva said to be that of *Hydrilla palustris* from Germany.

The Prey of Dung-Flies (Diptera, CORDYLURIDAE).

Mr. B. M. HOBBY said that the predacious habits of the CORDYLURIDAE had long been known, but few definite observations had been published, and the extent of their attacks was probably insufficiently recognised.

The mouth-parts of *Scatophaga stercoraria* had been figured by Cotterell (1920), who stated that they resembled those of *Calliphora* and *Musca*, but the internal chitinised structures of the labellum and haustellum were stronger. Attacked flies were seen to have the neck extended, and a distinct hole pierced through both sides. This probably damaged the nerve cord, causing partial paralysis. The presence of specialised poison-glands had been demonstrated in the ASILIDAE (Whitfield, 1925), but not in the CORDYLURIDAE. A large amount of fluid—probably acting as a solvent—was secreted, and the contents of the thorax were sucked out through the neck. The head was then turned round, a puncture made inside the oral margin, and the contents of the head, including the eye pigment, sucked out. Further punctures were then made through the thinly-chitinised membranes between the coxae and sternites. This sequence of methods in dealing with the prey was invariably followed, but, when food was abundant, the parts were only partially sucked out, the abdomen often being untouched. Poulton (1906) recorded an observation by Morley, in which the front of the thorax was attacked after the head had been sucked dry. Sanders, quoted by Hewitt (1914), observed that the neck was attacked from below and in some cases severed. The necks of the exhibited specimens were in many cases lacerated, and the contents of the head, including the eye pigment, sucked out. In some cases the head was missing.

The exhibitor said that all the *S. stercoraria* he had observed with prey were

found resting in hedgerows. Some insects (e.g. *Mellinus arvensis* and *Asilus crabroniformis*) frequented dung in order to find their prey, but he thought that this habit in *Scatophaga* was mainly connected with the mating of the sexes. Some of the exhibited specimens had been taken either on dull days or in the evening. This might be merely accidental, but it suggested that *Scatophaga* might be more successful as a hunter at a time when other insects were more sluggish. He hoped that special attention would be paid to these points in the near future.

S. stercoraria was to be found all the year round, but had only been observed with prey from April to November. The proportion of male captors (46 ♂♂, 31 ♀♀, 2 sex indet., 1 intersexual) was of great interest, since in some other groups (ASILIDAE and COENOSINAE) the female sex was more frequently observed with prey. A possible explanation was that the male *stercoraria* was more conspicuous than the female, and therefore less likely to be overlooked. In only one instance was a female *in cop.* observed to be in the possession of prey, but this had often been seen by Austen (1921).

With but three exceptions (1 Tenthredinid, 1 Fulgorid and 1 Psocid) all the prey were Diptera—20 families being represented. Although usually of medium size, some of the prey were quite small (*Spaniotoma*), but a few (e.g. *Pollenia*) were nearly as large as the captor. Occasionally one species was extensively preyed upon at the same time and place (e.g. *Simulium* and *Spaniotoma*). This was clearly due to the predominance of these insects in the particular locality. These species, together with common BIBIONIDAE, TACHINIDAE and ANTHOMYIDAE, made up a large proportion of the prey. There was no instance of either *Lucilia* or *Calliphora* among the prey, and it was quite evident that *stercoraria* would be useless as a check to the blowfly pests of sheep-farming countries (*vide* Cotterell, 1920; Austen, 1921).

All the 54 observations on the prey of *S. scybalaria* were made in a water-meadow near Nursling, Hampshire. A willow-tree overhanging a small river sheltered a swarm of *Simulium*, and numbers of dung-flies, doubtless attracted by the abundance of suitable prey, were always to be found hunting about it; not one was seen with prey in other parts of the field. The large proportion of *Simulium* (38 = 70.3%) among the prey, was probably due to the special character of the local insect fauna. This observation, made in six visits extending over rather more than a fortnight (13 Sept.–1 Oct.), would suggest that during the season, and in this restricted locality, there was a very great mortality in this particular group of Diptera due to Cordylurids alone. *S. scybalaria* was able to capture large insects (e.g. *Orthellia*), and possibly in other localities its prey would be of a more general nature. Observations which might test this suggestion were much to be desired. In contrast to *S. stercoraria*, females were more often seen with prey than males (42 ♀♀, 3 ♂♂, 9 sex indet.).

Of the remaining species the material was insufficient to admit of any general conclusions. The chief points of interest were: 1.—*S. squalida* taken with *Spaniotoma* on six occasions (cf. *S. stercoraria*—possibly on the same date). 2.—*S. inquinata* with a Chalcid. Due probably to their hard integument, the Hymenoptera were evidently rarely (two records) taken as prey by Cordylurids. 3.—*S. lutaria* and *S. ordinata* with single examples of *Calliphora erythrocephala* and *C. vomitoria* respectively.

A detailed list of prey together with a bibliography will appear in *Trans. Ent. Soc. S. England.* 1931, No. 7.

Observations on insects in Ngamiland.

Dr. G. D. HALE CARPENTER communicated the following observations made during a tour in Ngamiland from November 1930 to February 1931, and exhibited a series of views taken by himself.

LEPIDOPTERA. The fine specimen of the Cossid *Azygophleps inclusa*, Walker, exhibited was found impaled through the neck on a long thorn, alive, but unable to flutter its wings or do more than feebly move its legs. It had evidently been put there by a Shrike, and had deposited a cluster of eggs at the base of the thorn.

Large numbers of almost full-grown larvae of a Saturniid, *Nudaurelia belina*, Westw., were seen on young Mopani bushes, which were in some instances defoliated. The larvae have short stout spines and are of a dirty greenish-grey colour and very unprepossessing appearance. Still more so are they when they have been boiled and are laid out in the sun to dry before being eaten. One would have thought that the spiny tough skin would have been a deterrent!

HYMENOPTERA. Bembecid wasps were abundant, and when we halted on the march would fly round the legs and under the belly of donkeys and horses, obviously searching for blood-sucking flies. Tabanids were not numerous at that time, but *Hippobosca* sp. (probably *H. rufipes*) was very plentiful. When a *Bembex* flew round a donkey, closely examining the legs and belly, the flies all remained among the hairs, and as none took to flight, even the full-fed individuals, the *Bembex* was never seen to catch one. The sedentary habits of *Hippobosca* apparently saved it from *Bembex*, and it would be interesting to know if these flies have ever been seen to be captured by *Bembex*, which seems usually to capture its prey on the wing.

HEMIPTERA. On 12th Nov. a large millipede (probably *Spirostreptus* sp.) was found with a black and brown Reduviid (*Physorhynchus crux*, Thunb.) holding on to its posterior end and apparently trying to feed from it. The bug seemed to have injected some of its poisonous secretion, for the legs of the millipede were paralysed behind the point of attack.

I put them both into a large glass-topped pill-box to watch further developments, but about an hour later both were dead. It seemed curious that the Reduviid should have died; one wondered whether the millipede's unpleasant odour had been too much for it. Another bug of interest was a small Coreid, *Euthetus leucopoeilus*. This ground-frequenting species is black with white areas on the abdomen and tegmina, which by "painting out" certain parts give a very Hymenopteroid appearance, the long slender limbs and antennae suggesting a Psammocharid.

ODONATA. On 10th December several European Bee-eaters on trees on the steep bank of the Okavango river were seen constantly flying out over the river and returning with prey. In one instance I was able to see very clearly that the insect being devoured was a large dragonfly. It would be interesting to know whether, in Europe, the Bee-eater devours Odonata, its predilection for Hymenoptera being much better known.

DIPTERA. An extremely wasp-like Bombyliid proved to be a species of *Systrophus* not represented in the British Museum. The abdomen is long, thin, and petiolate, so that when flying, with the long legs hanging down in a cluster, the insect resembles a wasp such as *Ammophila*.

Among the Asilids seen was a very fine species, probably a *Proagonistes*, which has an appearance strongly resembling a Psammocharid. The general colour is a shining blue-black, the head and legs being rusty red. On the three occasions that I have seen this type of Asilid it has alighted head downwards on a tree trunk, a habit similar to that of the bee-like *Hyperechia*. Another species, *Lamyra gulo*, Loew, ♀, when in flight, was remarkably like a *Belonogaster* wasp. It was black, with brown wings, with white marks on the side of the abdomen producing the appearance of the petiole of a wasp. The deceptive appearance was aided by the long legs hanging down in a bunch, as in the wasp.

A smaller grey species, a small species of *Alcinus*, surprised me by suddenly pouncing on a Lymantrid larva which, as I sat on the ground, I had flicked off my leg. It was probably the movement as the larva went through the air which attracted the notice of the fly, for it very soon dropped the larva, which was hairy, having inserted its proboscis and rendered the larva inert. The larva was probably too heavy to be carried off.

A pair of the large blue-black Ortalid, *Bromophila caffra*, Macq., with a reddish head attracted attention at 2 p.m. on the 6th of January. The male sat far back on the dorsum of the female, his front legs reaching forward to embrace her neck; with a long organ of the thickness of a horsehair he appeared to be endeavouring to effect copulation, thrusting and poking with it at the under surface of the abdomen of the female. She, by movements of her wings, oscillated her body from side to side and appeared not to be receiving his attentions with favour. While I watched, the male hauled himself further forwards, shifting the grip of his front legs so that one tarsus was placed on each side of the head of the female: he then projected his unpleasant-looking snout forward to meet that of the female, who turned hers upwards and backwards. There was undoubtedly a transference of fluid from one snout to the other, and it seemed as if the male were the actual donor. The male then resumed his position further back, and the same movements were made as above described. Exchange of fluid, with adoption of the forward position by the male took place three more times, after which the oscillatory movements of the female became definitely violent, with a buzzing noise, and both flies fell to the ground, where I secured them. It seemed that the female did not allow copulation, although she received a gift.

This large fly fulfils all the canons of an aposematic insect. Its coloration makes it conspicuous whether sitting freely exposed on leaves or twigs or flying slowly and heavily. It is of sluggish habits and, to mankind at least, is a very unpleasant-looking creature. A *Cercopithecus* monkey on which I tested it during the war was evidently of the same opinion (*Trans. Ent. Soc. Lond.*, 1921: 72); thus it might be expected that this typically aposematic insect would serve as a model for mimicry.

It seems possible that a Psammocharid wasp, kindly determined by Mr. Benson as *Psammochares* sp., probably *dichrous*, Brullé, which I found to be common in the same locality, may be synaposematic with this fly; it is of similar blue-black

coloration with the head and anterior part of the thorax reddish; the red tint, however, as in the fly, is not well seen in a dead specimen.

Coloured drawings of the Uganda Notodontid larva, *Furcula marshalli*, Hampson.

Prof. POULTON showed the excellent coloured drawings of this caterpillar kindly given to him by Mr. G. L. R. Hancock, and referred to on p. 22 of the present volume. The conspicuous and apparently aposematic appearance was very evident in the drawings.

Mr. W. W. A. Phillips' Experiments with Lepidopterous food on a Ceylon Lemur.

Prof. POULTON said that he had received some extremely interesting notes on feeding experiments made by Mr. Phillips, of Gammaduwa, upon a Ceylon *Loris*. The wings of Lepidoptera offered to the Lemur were also sent, having been kindly determined by Mr. G. M. Henry of the Colombo Museum. The species of Lepidopterous groups with aposematic colours and behaviour were almost invariably rejected and those with procrryptic colouring and behaviour devoured. It was hoped to communicate the detailed results of the experiments in tabular form, but Mr. Phillips was continuing the work, and it was thought better to bring a more complete statement before a meeting in the near future.

Exhibition of lantern slides.

Prof. POULTON showed upon the screen Mr. A. G. Britten's two photographs of a young cuckoo being fed on *Pieris rapae*, L., by the fosterer, reproduced in plates 2 and 3 of this volume. The second of these had not been previously shown to the Society. He also projected on the screen a beautiful coloured slide drawn for him by his kind friend the President. It represented the fictitious Bracon cocoons spun by the larvae of the W. African Bombycid moth *Norasuma kolga*, on the outside of their own cocoons. Miss Tassart's beautiful drawing of this interesting discovery made by Dr. W. A. Lamborn, O.B.E., was reproduced in Pl. XV of 1931, *Trans. Ent. Soc. Lond.*, 79.

Papers.

The following papers were read :—

"The structure of the compound eye of *Aleurodes brassicae*," by Dr. H. ELTRINGHAM, F.R.S.

"A Contribution towards the study of the genera of the EPIPASCHIINAE (PYRALIDAE)," by Professor A. J. T. JANSE.

"Studies on New Zealand Mayfly nymphs," by Capt. J. S. PHILLIPS, M.C.

"Two specially significant examples of insect mimicry," by Professor E. B. POULTON, F.R.S.

Wednesday, June 3rd, 1931.

Dr. H. ELTRINGHAM, F.R.S., President, in the Chair.

Election of Fellow.

The following was elected a Fellow of the Society :—J. SNEYD TAYLOR, M.A., Barberton, Transvaal, South Africa.

Obituary.

The death of Dr. F. MUIR was announced.

Nomination of a Member of Council.

The SECRETARY announced that Professor E. B. POULTON, F.R.S., had been nominated to fill the vacancy on the Council caused by the death of Dr. MUIR.

Gift to Library.

The gift by Dr. R. STEWART MACDOUGALL of a table for use in the Library was announced.

Exhibits.

***Glypta nigrotrochanterata*, Strobl., ♀, from Ireland.**

Dr. S. A. NEAVE, on behalf of the Rev. W. F. Johnson, exhibited an example of this rare Ichneumonid taken at Greencastle, Co. Down, August 18th, 1930. The specimen was a teratological one, with the left antenna malformed. He read the following communication respecting it :—

“The 12th joint of the flagellum is widened so as to become transverse, and from its apex project two joints, while the rest of the flagellum continues in the usual way. This gives the appearance of a break and a fresh growth.

“Dr. Roman writes of this species of which I sent him a specimen—‘remarkable, for nobody has recorded it since it was described from Styria, but in working out material from Kamtschatka I found 4 ♀♀, and on comparing your specimen, it was exactly the same.’

“Hence the range of the species is from the extreme west of Europe to the extreme N.E. of Asia. The insect is described by Dr. Otto Schmiedeknecht in his *Opuscula Ichneumonologica*, 3: 1206.”

***Pupation of Zegris eupheme meridionalis*, Led.**

Mr. N. D. RILEY said that at the meeting of the Society held on Oct. 6th, 1926, a communication from Lt.-Col. H. D. Peile was read asking for information upon the method of pupation in *Z. eupheme*, as he somewhat doubted the accuracy of the published accounts, which were all clearly based upon the observations made by Rambur many years ago, and attributed to the species a cocoon-making habit, which is very rare indeed in the PIERIDAE and quite unknown in any of the species to which *Z. eupheme* is most closely related.

Colonel Peile's inquiry was eventually seen by Mr. Harold Powell, of Morocco, who, having reared the butterfly concerned fairly recently, kindly sent the following note with the request that it be communicated to the Society. It will be seen

that his observations corroborate those of Rambur and disprove Colonel Peile's supposition that the insect pupates like a normal *Euchloë*. The following are Mr. Powell's notes :—

"When I reached Bekrit (a military post at an altitude of about 1820 metres in the Middle Atlas, Morocco) on June 10th, 1924, I found *Zegris eupheme meridionalis*, Led., still on the wing, but very few specimens were then in good condition.

"The larvae were common in several stages on *Isatis tinctoria*, L., feeding on the flowers and young fruit. The plant was generally seen growing in wheat or barley fields, but also occurred along roadsides and on waste ground. Many larvae were collected, but the proportion of parasitised individuals was considerable. Larvae of *Euchloë ausonia*, Hb., were also found on the same plant.* I did not make a description of the caterpillar of *eupheme*, thinking it was well known. It is much stouter than the caterpillars of the genus *Euchloë*, greyish-white in colour with black spots.

"The web it spins before fixing itself for pupation makes but a poor protection, but as the pupa is not often very firmly attached it may be of some use as, for instance, in the case of one in the cage which became detached as the larva was casting its skin; the pupa fell into the web spun beneath it and remained there. The larvae generally spun up in the top corners of the cage or on the sides close to the roof. As I had but few cages with me, they were too crowded and those pupating were in many cases disturbed by later individuals seeking a place in which to spin up. A few of the freshly formed pupae were partly eaten by larvae which had wandered from the food-plant before being full-fed.

"The pupa is a pale stone-coloured, plump, rather stumpy object with a snout which is short compared with those of the *Euchloë* genus. In the wild state it probably is attached to the underside or in a cavity of one of the very numerous loose blocks (sometimes basalt, sometimes limestone) which strew the ground in that region, but I never found one.

"The imagines from the pupae brought back from Bekrit emerged at Hyères between April 17th and May 5th of the following year. There was a large proportion of cripples, and several of the pupae had died during the autumn and winter.

"The following are extracts from notes taken at the time :—

"*Bekrit, 14th June, 1924.*—A few larvae of *Z. eupheme meridionalis* were found again this morning. Many of these larvae succumb in the third instar to internal injuries caused by the solitary larva of an *Apanteles* (?) which emerges from the body of the caterpillar and at once spins a cylindro-ovoid cocoon $4\frac{1}{2}$ mm. in length and $1\frac{1}{2}$ mm. in breadth, of a yellowish white or sometimes pale beige colour.

"In the last instar, when nearly full-fed, the caterpillar sometimes falls a victim to another species of *Apanteles*; in this case the grubs of the parasite are numerous, and after leaving the body, form beneath the caterpillar a mass of white cocoons, each one cylindro-ovoid in shape but more slender (4 mm. \times 1 mm.) than in the case of the solitary species. These white cocoons are enveloped in a matting of white silk strands. The caterpillar remains motionless for about 12

* The caterpillars of *Euchloë ausonia* at Bekrit were very frequently victims of another Hymenopterous parasite. The grub of this parasite (solitary) kills the larva in the penultimate instar, remaining in the body, and its cocoon distends the skin without breaking it.

hours before the grubs emerge. (The *Apanteles* imagines in both cases hatched out towards the end of June and in the beginning of July.)

"The ground-colour of the caterpillar of *Z. eupheme meridionalis*, when full-fed, changes from greyish-white to dull yellow. After having ceased feeding, it wanders about the cage for a day and a half before settling down for pupation. It then spins a network of fine silk cords, an attempt at a cocoon of the nature of that seen in *Thais* but denser and less rigid; then it fixes itself to a wad of silk by the anal prolegs and spins a thread around the body as do other Pierids.

"15th June.—Several specimens of *Z. eupheme meridionalis* (imagines) seen and caught, but almost all were badly worn. Very many larvae found on the flowers and young fruit of *Isatis tinctoria*; a large number parasitised by the solitary *Apanteles*. Several caterpillars are now pupating in the cage.

"18th June.—Two *meridionalis* captured at Oued Senoual, both worn. Several larvae.

"22nd June, Bekrit.—M. E. Jahandiez found a larva of *meridionalis* this morning on *Hirschfeldia adpressa*, Moench. This is the first time we have noted the species feeding on any other plant than *Isatis tinctoria*."

The correct magnification of Plate V in 1930 *Proc. Ent. Soc. Lond.*, 5.

Prof. POULTON said that, owing to an unfortunate but very natural misunderstanding, the statement, on Pl. V of last year's *Proceedings* that "all figures are natural size," is incorrect. All are about $\frac{4}{5}$ of the natural size.

Association of Birds' Nests with Nests of Insects.

Prof. POULTON said that he had received the following comments on Mr. W. B. Alexander's notes in 1930-31 *Proc. Ent. Soc. Lond.*, 5: 111, from his friend, Dr. J. G. Myers.

"10 April 1931. *Trinidad, B.W.I.*

"Thank you most heartily for the advance copies of Alexander's most interesting notes on birds and insects nesting together. It is curious that there is in New Zealand a *Pseudogerygone* which builds a nest similar to that of the Australian species, but I have never seen it near wasps' nests, largely, I imagine, because these were absent from the original fauna, though an introduced Australian *Polistes* is now fairly common in the north. It will be interesting to see whether it will acquire the habit of building near these *Polistes*. I showed the published observations on American and African birds and wasps to Mr. Belcher, the new Chief Justice here, who is a very keen ornithologist, and he has written some comments, which I enclose, based on his own work in Africa."

The following extract from Mr. Justice Belcher's letter was sent by Dr. Myers. They refer to 1929, *Proc. Ent. Soc. Lond.*, 4: 88, 89.

"Always with small birds the insect nest is there first, not *vice versa*."

"At p. 88, bottom. A fourth race *Uraeginthus bengalus niassensis* has the same habit: with 2 different wasps. I see Loveridge has noted this.

"P. 89, *Cisticola lugubris*. This has nothing to do with association; but it is very common to find wasps using old abandoned nests as a site.

"*Lophoaëtus occipitalis*. Mere convenience again, I imagine, and here without question the nest would be first *in situ*."

"*Lagonosticta senegalla*. I never saw this species building in the site suggested : either a *Pytilia* or a *Uraeginthus* was probably the bird.

"African Ant Thrushes (*Myrmecocichla*). The birds gain nothing from the association that I can see, and I believe it is simply that the old (often disused) termite mounds, in whose cavities these thrushes build, provide a convenient ready-made receptacle; and as to the Australian analogies (usually Halcyon Kingfishers) it is simply that, earth banks being rare and perhaps less soft, the birds choose a substituted site—but I say this tentatively, as it is possible the bird is really parasitical on the insects to the degree indicated in the following note (p. 90) on the Indian Woodpeckers of which I have no knowledge. Such a mode of feeding, however, seems unlikely in a Kingfisher."

Mr. W. B. Alexander has kindly written the following further notes on the Australian birds nesting in Termitaria, in reply to the above comments:—

"In writing about the Australian birds which regularly or frequently breed in termites' nests I confined myself to giving the facts and did not make any suggestions as to the possible reasons for this habit.

"I gather from this note that in Africa species of *Myrmecocichla* frequently place their nests in cavities of termitaria, but if so this is hardly 'analogous' with the Australian examples I quoted, which in all cases actually excavate burrows in the termites' nests.

"The suggestion that they choose such positions because the material to be bored into is soft may apply to *Tanysiptera sylvia*, which, as I mentioned, excavates its holes in a soft type of white-ants' nest. But the other species select the very hard arboreal or terrestrial termitaria. The actual hardness of the material of which they are composed is probably greater than that of any timber or soil, but when once the outer shell has been pierced the tunnels in the interior of the nest no doubt facilitate excavation.

"I gather from the note also that certain Indian woodpeckers feed on the termites, but it is suggested that this is unlikely in the case of kingfishers. The Halcyonine kingfishers feed principally on insects, small reptiles, etc., and it seems to me highly probable that they eat any termites that they find when making their nesting-holes. I do not think it likely that the holes are made primarily to obtain the termites as they are such regularly shaped structures, but if the termites were not eaten they would soon repair the breach.

"In the case of *Varanus* lizards, which are rather fond of making a hole in a termitarium in which to lay their eggs, the hole is soon filled up again by the termites, leaving the eggs embedded in the nest. Whether the young *Varani* when hatched are able to get out I do not know.

"It would seem less likely that parrots of the genus *Psephotus* would eat termites, but I think they must either eat them or kill them to prevent the insects building up the hole.—W. B. A., 4 June, 1931."

Miss Longfield had also kindly directed his attention to the notes on these associations in the "Bull's Horn" Mimosa, described on pp. 206, 207 of Mr. C. L. Collenette's *Sea-girt Jungles* (London) [1926]. The author writes of this Mimosa that "Its cruel paired thorns are hollowed out when young and green by two

different species of ant, which I found occupying homes on separate plants. I had to examine very many fully developed thorns before I could come upon one which was untenanted." Contrary to the observations on *Melastomae* described by Dr. D. Melin (1930, *Zool. Bidrag, Uppsala*, 13: 87), "The delicate foliage of the bush, protected by thorns and ants, flourished whole and untouched by voracious enemies, whereas surrounding vegetation often showed more damaged leaves than sound ones."

In one bush, with a bird's nest, was "a small wasp, which suspended its fragile communal nests from the branches." When the author approached, the bird flew off, but "neither ants nor wasps were disturbed" until he, "as delicately as possible, reached up and took out the eggs." Ten to fifteen nests, similar to the above, were also found in these bushes, but none of the others contained eggs. Wasps' nests, also similar to the above, and as Mr. Collenette informs me, probably of the same species, were only observed in the Bull's Horn thorn *Mimosas*, but he does not remember whether there was any tendency for the birds and wasps to build in the same bush. He suggests, however, that the wasps benefit by the association with the ants, for their nests "if placed in other situations . . . would sometimes be damaged unintentionally by browsing animals or small climbing mammals." It was interesting to compare this observation and suggestion with Dr. Myers' conclusions as to *Polybia* and *Azteca* (*Proceedings*, 4: pp. 85-88).

***Acraea encedon*, L., mistaken for *Danaïda chrysippus* in S. Uganda.**

Prof. POULTON communicated the following note from his friend Mr. W. C. Simmons, F.G.S., and exhibited the specimens referred to:—

"After a long silence I hope I may send along to you herewith two butterflies caught *in coitû* to-day, 22/2/31, at Rakai, Koki (West of L. Victoria, Southern Uganda), the larger brown female carrying the more normally coloured male along with it. I think it is *Acraea encedon*, and have never seen such a bright female before. When we arrived at this camp (where mosquitoes bite all day), I thought that a great number of small *Danaïda chrysippus* were about, but now realise that I have not as yet seen a single one. The female *Acraea encedon* which I am sending seems to me to be mimicking this Danaine even more closely than usual. When the *Acraeas* were caught in the fingers much yellow juice was extruded. There are no forests to speak of here and butterflies are not common—except *Papilio demodocus* and *Precis*."

It was interesting to compare this experience with that recorded by Dr. W. A. Lamborn and Mr. Rodney Wood, who were at first completely deceived by the resemblance of *Mimacraea marshalli*, Trim., when on the wing, to *A. encedon*, in Nyasaland (1929, *Proc. Ent. Soc. Lond.*, 4: 107). Dr. Hale Carpenter had informed him that he had observed the same resemblance in W. Uganda, while Mr. G. H. E. Hopkins had been at first completely deceived by the *Acraeine* flight and appearance of the allied *Mimacraea poultoni*, Neave (*Ibid.* 1930, 5: 3). The resemblance of *marshalli* to *encedon* had been pointed out in 1902, *Trans. Ent. Soc. Lond.*, 1902: 470, and to the primary model of both, *Danaïda chrysippus*, on pp. 471, 472; also the capture of the first example of the *Mimacraea* when it was mistaken on the wing for *D. chrysippus*, by Sir Guy Marshall, on pp. 481, 482.

The position of the pair of *A. encedon* sent by Mr. Simmons was somewhat

remarkable. The accompanying sketch, confirmed by the papered specimens, showed that male and female were facing each other, the posterior ends of their bodies being bent very acutely. It appeared probable that they were seated on the opposite sides of an upright stem.

Ithomiine butterfly model and Callimorphine moth mimic with similar flight. Butterflies bearing evidence of attack.

Prof. POULTON exhibited the following specimens taken in Panama and British Guiana by Dr. C. B. Williams, and communicated his notes on them. The evidence of similarity in flight between the model and mimic, noted down at the time, was of much interest. The butterflies had been kindly determined by Mr. N. D. Riley and the moth by Mr. C. L. Collette.

The Ithomiine butterfly, *Ithomia jucunda*, Godm. & Salv., ♀, was captured, together with its mimic the day-flying moth *Lauron rica*, Godm. & Salv., on 17 May 1917, at Guabito near Bocas del Toro, N.E. Panama. The moth was also labelled—"usually in forest but sometimes in bush; flies like Heliconine." (The ITHOMIINAE were formerly included in the HELICONINAE, as they were by H. W. Bates in his classical memoir.) Dr. Williams had informed him that he had also noted under the same date—"A bluish transparent winged butterfly (? Heliconiid) and a moth not unlike it in general appearance and flight. See previous note on the moth, which I caught thinking it was a butterfly." This note, dated 24 March 1917, and referring to another specimen of *Lauron* was as follows—"caught one moth, blue and transparent, resembling *Heliconia* in flight."

The two symmetrically injured Nymphaline butterflies were (1) *Chlorosyne lacinia*, Geyer, ♂, labelled "Chiriquicito, 10 March 1917. Hind-wings bitten symmetrically." The locality was about 20 miles S. of Bocas del Toro, N.E. Panama. The injury was probably caused by a lizard, but there were also probable beak-marks on the upper surface of the left fore-wing. (2) *Phyciodes elio*, L., ♂, labelled "Issororo, June 1916. Note symmetrical bite?, out of top of wing." The locality was in the N.W. District of British Guiana. The deep narrow cleft strongly suggested the effect of a bird-attack, confirmed by the presence of a distinct beak-mark on the right fore-wing, near the injury.

A frog-like Reduviid Bug from Borneo.

Prof. POULTON exhibited a coloured drawing of *Amulius longiceps*, Stål (APIOMERINAE), kindly sent to him by Mr. E. Banks, Curator of the Kuching Museum, Sarawak. The specimen, the first seen by the captor, was taken "near Tanjong Datu, 21.vi.1926. It was found resting on bark of a big tree, about 3 ft. from ground, head downwards, as in drawing. When threatened it walked backwards up tree, waving its two anterior legs alternately, and not letting them touch the bark. Finally it flew off very shakily, and tried to alight on the trunk of another tree, but became fixed by its own adhesive legs."

Mr. Banks described these conspicuously held anterior legs as "rosin-coloured and translucent," and the whole shape so frog-like that, as he wrote, "I put my hand down in front of the actual tail [the apparent head] thinking I should catch

the frog as it jumped forward." His note continued—"It is, I think, a well-known species, fairly common. . . . There is also another form with the exposed marginal area of the abdomen black instead of red as in *longiceps*. I also obtained another specimen with no mucus on the anterior legs, but it appeared to pour out this secretion from its mouth and smeared it on the legs. This specimen pierced my finger, causing quite a sharp pain. After death specimens of these two species quickly lose their sharply contrasted tints—the marginal bright red or black and the black and white—of the dorsal surface." Mr. Banks also suggested that *Rana glandulosa* was a frog to which one of these Reduviids bears a very general resemblance.

The position, shape, and colour of the anterior legs were certainly extremely like those of a frog's hind legs, and the resemblance was doubtless strongly emphasised by the movements described. It was most interesting to be able to record these notes on the living insects and to learn of resemblances which would never have been realised by studying the dried specimens. It was much to be hoped that Mr. Banks would be able to add still further to our knowledge of the two species. How little was known on the subject might be inferred from the following note kindly written by Mr. W. E. China :—

"So far as I know nothing has been published concerning the habits of Reduviids of the subfamily APIOMERINAE allied to *Amulius*. One of the Dutch entomologists from Java or Sumatra, whose name I do not remember, told me that the long front hairy tibiae were covered with the resin exuding from the bark of trees, on which they lived, and in this way the creatures collected small insects upon which they fed. I believe that this entomologist was going to publish an account of the life-history of one of the species, but I have not yet seen it in print. The sticky substance upon which many larval REDUVIIDAE, e.g. *Acanthaspis*, depend for attaching various particles of dust, etc., for the purpose of masking their shape, are secreted by glandular hairs, and it is possible that similar hairs are concentrated upon the front legs of members of the *Amulius* group of Reduviids, but I have no definite information upon this subject."

The Pairing of *Diaphora* (*Spilosoma*) *mendica*.

Prof. POULTON said that Dr. G. V. BULL, B.A., M.B., had kindly sent him the following note on the pairing of this Arctiid moth :—

Scorer in the "Entomologists' Log-book states that *D. mendica* will pair in an airy cage. I left 2 ♂ and 6 ♀ in an airy cage for two nights and no pairing took place. Next morning I put 2 ♂ and 4 ♀ in a large chip box, meaning to turn them out in the garden after breakfast: on opening the box half-an-hour later to liberate them, I found that both the ♂♂ had paired. Many ova were laid and have proved fertile."

It appeared probable that flight in the airy box and the time which had been passed in it had rendered the males susceptible to the stimulus which leads to pairing and that the moment was perhaps determined by the act of transference by which they would have been roused from quiescence. Dr. Bull's earlier experience with *Saturnia carpinii*, Schiff., affords an interesting comparison (1928, *Proc. Ent. Soc. Lond.*, 3 : 37, 38).

Bees taken visiting Orchids in France.

Prof. POULTON exhibited the following specimens kindly sent to him by Col. G. H. EVANS, C.I.E., C.B.E. They were a most interesting addition to the series exhibited on 5 Nov. 1930.

BEES CAPTURED IN 1930, AT ANNECY, H. SAVOIE.

B. Visiting *Cephalanthera rubra*.

(Continued from 1930, *Proc. Ent. Soc. Lond.*, 5 : 103.)

- | | |
|--|------------------|
| No. 18. <i>Osmia</i> sp., probably <i>coerulescens</i> , Gir., ♂ : June 25 | } With pollinia. |
| No. 19. <i>Heriades rapunculi</i> , Blanch., ♂ : June 25 | |

BEES CAPTURED IN 1931 AT VALESCURE, NEAR ST. RAPHAËL (VAR), ON
BARLIA LONGIBRACTEATA, ALL WITH POLLINIA.

- A. *Bombus terrestris*, L., ♀ : Febr. 9.
- B. " " " : Febr. 10.
- C. *Apis mellifica*, L., ♀ : Febr. 11.
- D. " " " : " 23.
- E. " " " : " 25.

In addition a specimen of *Bombus terrestris*, ♀, taken on *Barlia* and bearing pollinia, 22 Febr. 1930.

Another example, seen on the same date, escaped.

The bees had been kindly determined by Monsieur L. Berland, of the Muséum d'Histoire Naturelle, Paris.

Col. Evans had never before seen *Apis mellifica* visiting *Barlia*. On this occasion he saw others going to the flowers in addition to the three recorded above.

Insects fertilising *Orchis maculata*, L., near Oxford.

Mr. O. W. RICHARDS said :—In the years 1925–1927 I made some observations on the insects visiting the flowers of the above species of *Orchis*; unless otherwise noted, all the observations were made in Bagley Wood, Berks, nr. Oxford.

The following insects were seen on the flowers :—

- 12th June, 1925. *Empis livida*, L.
- 14th June, 1925. *Apis mellifera*, L. (worker).
- 13th June, 1926. *Bombus pratorum*, L. (male : exhibited); *Psithyrus sylvestris*, Lep. (male). These bees receive the pollinia on their head; in their efforts to clean themselves they often nearly destroy the pollinia.
- 17th June, 1927. *Augiades sylvanus*, Esp.; *Empis livida*, L. The fly bore a pollinium on its left eye.

The following insects were caught bearing pollinia, probably of the above species of *Orchis* :—

- 16th and 18th June, 1926. *Psithyrus sylvestris*, Lep. (male).
- 25th May, 1927. *Angitia rufipes*, Grav. (female : exhibited); the pollinium was attached just beneath the left antenna.

At Cothill, Berks, 6th June, 1926, a beetle *Grammoptera ruficornis*, F. (exhibited), was found on the *Orchis*; the pollinia were attached to the head between the antennae.

Some features of the internal anatomy of certain small Trichoptera.

Dr. H. ELTRINGHAM gave an account, illustrated by lantern slides, of certain curious tracheal vesicles found in the males of Caddis Flies of the genera *Diplectrona* and *Agapetus*. The discovery of the organs was due to Mr. Martin E. Mosely. Whilst there were four of these structures in the male abdomen of *Diplectrona*, there were only two in *Agapetus*. Though apparently a secondary sexual characteristic, it was extremely difficult to imagine what their function might be. Full details would be found in a paper shortly to be published in the *Transactions*.

Papers.

The following papers were read :—

“An abnormality of pattern in larvae of *Mamestra pisi*, L.,” by Dr. E. A. COCKAYNE.

“Some peculiarities of the Abdominal Structure in certain male Trichoptera,” by Dr. H. ELTRINGHAM, F.R.S.

“The dates of Hübner’s *Papiliones* plates,” by Capt. A. F. HEMMING, C.B.E.

“Additions and corrections to the Author’s *Butterflies of Jamaica*, 1926,” by Mr. W. J. KAYE.

“Some new Trichoptera from Africa and British Guiana,” by Mr. M. E. MOSELY.

“Indo-Australian and Ethiopian species of *Spathius*,” by Mr. D. S. WILKINSON.

Wednesday, October 7th, 1931.

Dr. H. ELTRINGHAM, F.R.S., President, in the Chair.

Election of Fellows.

The following were elected Fellows of the Society :—ANASTASE ALFIERI, P.O. Box 430, Cairo, Egypt; F. MARTIN BROWN, Avon Old Farms, Avon, Connecticut, U.S.A.; BERNARD DEARMAN BURTT, Tsetse Research Department, Old Shinyanga, Tanganyika Territory; STANLEY GARTHSIDE, Farnham House Laboratory, Farnham Royal; JOSEPH ROBERT SHAW, “Arundel,” Warwick Road, Solihull.

Obituary.

The deaths of Professor A. FOREL (an Honorary Fellow), Mr. A. PHILPOTT and Dr. A. FAZ, were announced.

Exhibits.

A pretence of stinging by a Tipulid.

Dr. H. ELTRINGHAM exhibited an example of the female of a Tipulid which had been identified by Mr. Collin as *Ctenophora pectinicornis*, L. It was found near a window in his house. On picking it up and holding it by the wing, it turned its abdomen over its back and thrust vigorously at his finger with its ovipositor. The abdomen of the species is unusually hard, banded with black and yellow, and alto-

gether very suggestive of a stinging Hymenopteron. It seemed to him that this pretence of stinging might be enough to alarm many natural enemies of the insect.

Neither Mr. Collin nor Dr. Edwards had heard of any previous record of this peculiar habit.

An extrusible organ in *Mantispa styriaca*.

Dr. ELTRINGHAM showed a lantern slide illustrating a male *Mantispa styriaca*, and the histology of the dorsal abdominal gland. The material for the investigation had been kindly obtained for him by Mr. Hugh Main. He hoped it would be possible shortly to publish the details of the research in a paper in the *Transactions*.

Some Trichopterous egg masses from a lake in Windsor Forest.

Mr. H. DONISTHORPE said :—

“ Besides making an intensive study of the Coleoptera of Windsor Forest, we take anything that we think may be of interest or use to anyone. One of our last finds was a bit of hard fungus in an unusual situation, of unusual shape, and smelling like a dusty mouse ! Mr. Ramsbottom is rearing cultures from it.

“ These introductory remarks are my excuse for my first exhibit. On September 20th last we were collecting round a large lake in Windsor Forest, and simultaneously observed two jelly-like masses on leaves of a sallow bush growing over the water. These masses attached to their leaves were carefully placed in a large tube. Eggs in one of the masses could be seen placed in regular rows, but when the other was examined under the microscope, many small six-legged larvae could be seen moving about inside the jelly.

“ Mr. M. E. Mosely has made the two mounts now exhibited, and he informs me that :—

“ The two egg masses are Trichopterous, probably those of *Limnophilus flavicornis*, F. The young larvae are hatched in the jelly mass and fall out into the water beneath. In some species the ♀ descends beneath the surface and attaches the egg mass to some weed or stone, and hatching takes place under water. In certain genera the eggs are deposited in a string without any surrounding jelly mass, i.e. *Polycentropus* and the HYDROPTILIDÆ.”

Two species of Coleoptera new to Britain.

Mr. H. DONISTHORPE further said :—

“ On 13th June last when at Slapton Ley in Devonshire, I captured a ♂ and ♀ of *Malachius elegans*, Ol., settling on stones and by sweeping. This species comes near to *M. viridis*, F., of which insect I am showing both sexes for comparison, but is abundantly distinct. The excavation at the apex of the elytra in the ♂ and the spine therein are very striking. *M. elegans* has been found in France, Germany, Austria, Italy, and Spain, etc., and there are specimens in Champion's European Collection of Coleoptera from Switzerland.

“ Three days later (June 16th) when sweeping in a ride in Windsor Forest, I captured another species of *Malachius* new to Britain. At the time I took it to be *M. viridis*, which we had not found at Windsor since 1923. When the insect was set, however, I found it was not this species, and Mr. Blair and I have identified it as *M. lusitanicus*, Er. v. *australis*, Muls. It will be seen by comparison with the

♀ specimen of *M. viridis* that the antennae are quite different, the elytra are not metallic, etc. *M. lusitanicus* v. *australis* has been taken at Lyons and Marseilles in France.

Exhibition of specimens of *Strymon spini*, Schiff., Lepidoptera, LYCAENIDAE.

Mr. O. W. RICHARDS said this butterfly was found not uncommonly in the Vallouise, Dept. of Hautes Alpes, France, in July 1931. When at rest the wings are held vertically and the hind-wings are regularly moved slightly in the vertical plane. In some of the tropical Lycaenids in which the "tails" of the hind-wing are very long, this movement gives the effect of a false head, the tails representing the antennae. In the species exhibited the tails are too short for the resemblance to antennae to be very successful.

In the Vallouise the butterfly was attracted to the flowers of Marjoram (*Origanum*). On one patch of *Origanum* were caught one normal specimen and one in which the whole tail-area of the hind-wings is missing, possibly as a result of the attack of a bird.

The butterfly had been kindly identified by Mr. N. D. Riley.

Both sexes of *Papilio aristor*, God., from San Domingo.

Dr. K. JORDAN exhibited on behalf of Mr. D. LONGSDON, F.E.S., three specimens (both sexes) of *Papilio aristor*, Godart, 1819, obtained on 31st March, 1931, at Monti Cristi, San Domingo, at an altitude of 2000 ft. The species was originally described from a specimen in the Paris Museum which had no locality and seems to have disappeared. When inspecting the larger European collections for the purpose of the "Revision of the American Papilios," a single male was found in the collection of Charles Oberthür, which was figured in 1906, *Nov. Zool.*, **13**, pl. v, fig. 21, and which is now in the collection of Mr. John Levick, F.E.S., of Birmingham. So far as is known, it is the only specimen in Europe. The specimens exhibited prove that the hitherto unknown female is almost like the male in colour and pattern.

Wednesday, October 21st, 1931.

Dr. H. ELTRINGHAM, F.R.S., President, in the Chair.

Election of Fellow.

The following was elected a Fellow of the Society:—V. P. VARDÉ, B.Sc., D.ès-Sc., Locust Research Laboratory, Agricultural College, Lyallpur, Punjab, India.

Exhibits.

The forms of *Acraea althoffi*, Dew.

Dr. G. D. HALE CARPENTER exhibited a series of the different forms of *Acraea althoffi* with the species of *Planema* and *Acraea* that serve as its primary and secondary models, as well as specimens of *Acraea encedon*, L., corresponding to three of the female forms of *althoffi*.

He said that Professor Poulton had previously given an account of *althoffi* with its models and co-mimics (*Proc. Ent. Soc. Lond.*, 1924: cxi-cxvi).

A further complication is introduced by the fact that there is also a variety here described of the black and white female form *althoffi* which more nearly resembles the form *lycia*, Fab., of *A. encedon* than it does the true model of *althoffi* *althoffi*, namely the female form *jodutta* of *A. jodutta*, F.

The difference from the typical *althoffi* female lies in the reduction of the amount of black at the base of the fore-wing and along the margin of the hind-wing. The typical *althoffi* has, in the fore-wing, the two spots in area 1b and the spot in area 2 embraced by the basal black of the ground-colour on all sides except along the extreme outer margin of the latter spot and of the outermost of the two in 1b. But in the variety now distinguished the spots in 1b are almost, and that in 2 quite, free from the basal black, the base of area 2 being entirely white except for the one black spot. This increased whiteness of the base of the fore-wing detracts from the likeness to *jodutta*, in which the whole base of the wing is black, but produces a likeness to *encedon lycia*, which is much aided by the clearly defined black spots which on the whole occupy a position similar to those of *lycia*. There is also a white mark in this new variety, triangular in shape, with its base at the margin of the wing, in the black outer border of area 1b which adds greatly to the resemblance to *lycia*, in which the corresponding part of the fore-wing is white but cut up by black streaks. In normal *althoffi* females there is sometimes a minute white mark in this locality which is seen to be the area enclosed by the fork of the internervular black ray (characteristic of *althoffi* in both sexes, and better seen on the under surface of the wings). This small white mark has been much enlarged so that, as seen in the new variety, it has spread beyond the narrow confines of the fork. The hind-wing also shows a departure from the pattern of *jodutta* to that of *lycia* by a masking of the broad black border with white scales, so that while the border can be distinguished the general effect is white rather than black.

One of the two specimens of the new form shows a greater degree of suffusion with white than the other, so that the white area of the hind-wing extends outwards as far as the level of the middle of the fork of the internervular rays, leaving only a very narrow black margin, as in *lycia*. The black internervular rays are thus conspicuous against the white ground, and this is another factor in the resemblance to *lycia*.

It is interesting here to note that the black and white female form *carmentis*, Doubl. & Hew., of *Acraea jodutta* has an amount of white on the fore-wing greater than in the typical *jodutta*, which might make it serve as a model for this new form of *althoffi*, but the broad black border on the hind-wing militates against this.

Strong support to the suggestion that this new variety has departed from its likeness to *jodutta* towards *lycia* is afforded by the under surface of the base of the hind-wing. The primary models in this great combination, namely the females of *Planema macarista*, E. M. Sharpe, and *alcinöe camerunica*, Auriv., have at the base of the hind-wing on the under surface a very conspicuous red-brown triangular patch on which the black spots stand out sharply: this is the characteristic aposeme of the *Planema*. It is copied by the female *A. j. jodutta*, which mimics these black and white *Planema* and is often well marked, though variable in

intensity and sometimes only present as a bar between the black spots on each side of the base of the cell in *althoffi althoffi* which mimics *A. j. jodutta*. But in the new variety of black and white female of *althoffi* the basal brown is so extremely faint as to be quite negligible as a colour marking; in fact, a casual look would fail to recognise it. Now the hind-wing of *A. encedon lycia* shows none of this basal brown, nor is there any reason why it should, seeing that this species lies outside the *Planema* combination. This suppression of the Planemoid aposeme provides further support for the conclusion that *A. a. althoffi* has departed from its likeness to *A. j. jodutta* under the influence of *encedon lycia* to produce this new form now described.

Acraea althoffi, ♀ f. ***lycioides***, f.n.

Generally resembles *A. althoffi althoffi*, but differs in the following points:—

1. Fore-wing upperside. Area 1b. Basal black suffused with white so that the two spots are rendered more distinct. Triangular white spot in margin enlarged.
Area 2. Basal black absent, the spot lying entirely in white.
2. Hind-wing upperside. Black border strongly suffused with white.
„ underside. Basal brown very faintly visible as a bar connecting longitudinally the spots in area 1b, and also surrounding the two spots anterior to the base of the cell.

It is of considerable interest that while *lycia* appears to be the model for *lycioides*, there are other forms of *encedon* occurring in the same area as *althoffi* (e.g. the north coast of L. Victoria) which correspond to other forms of the latter. Thus, the pale yellow female form *ochreate*, Eltr., of *althoffi* mimicking the male of *jodutta* is well matched by the form *sganzini*, Boisd., of *encedon*, a rare form found also in localities where *jodutta* and *althoffi* do not occur. Also, the orange-brown female form *telloides*, Eltr., mimicking the form *dorotheae*, E. M. Sharpe, of *jodutta* has its parallel in a brown form of *encedon*, transitional between the typical form and the form *daira*, Godm. & Salv., in which the portion of the fore-wing cut off by the black subapical bar is brown instead of white. Examples of all these butterflies from the neighbourhood of Entebbe were among the specimens exhibited.

The type specimen of *A. althoffi lycioides* was taken by the exhibitor in the Sese Isles of L. Victoria, on Buninga, Aug. 27th, 1929, in company with the example of *A. encedon lycia* exhibited with it. The locality was a flowery patch beside a path running inland from the lake shore through the belt of forest which, to a depth of a few hundred yards, fringes the coastline of so many of the Sese Isles. Stress is laid upon the locality because it provided exactly the opportunity required for a true forest butterfly such as *althoffi* to come into contact with *encedon*, which frequents bush or open ground but is not found in large forests. On the same day large numbers of the male of *althoffi* and a specimen of its male-like female form *drucei*, Eltr., were taken, and *encedon*, in typical form, was common. On the next day a second specimen of *althoffi lycioides* was taken at the same spot, and a special note was made on the paper that it was exceedingly like *lycia* on the wing.

Examination of a number of specimens of *althoffi althoffi* in the Wiggins collec-

THE ENTOMOLOGICAL SOCIETY OF LONDON

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MEETINGS

TO BE HELD IN THE SOCIETY'S ROOMS

41, QUEEN'S GATE, S.W. 7

1932

Wednesday, January (Annual Meeting)	20
„ February	3
„ March	2
„ „	16
„ April	6
„ May	4
„ June	1

The Chair will be taken at Eight o'clock.

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